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L5: Entry 1 of 1

File: USPT

Jan 5, 1999

US-PAT-NO: 5855901DOCUMENT-IDENTIFIER: US 5855901 A

TITLE: Immunostimulating activity of Streptococcus pneumoniae serotype 8 oligosaccharides

DATE-ISSUED: January 5, 1999

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Malcolm; Andrew J.	Edmonton			CA

US-CL-CURRENT: 424/244.1; 424/197.11, 424/234.1, 536/123.1

## CLAIMS:

What is claimed is:

1. A composition useful for stimulating an immune response to an antigen, said immunostimulatory composition consisting essentially of:

a) an antigen, which antigen is not an oligosaccharide of S. pneumoniae serotype 8 and which antigen is not attached to an oligosaccharide of S. pneumoniae serotype 8;

b) an oligosaccharide of S. pneumoniae serotype 8 which contains an immunogenic epitope; and

c) a suitable pharmaceutical excipient, wherein said oligosaccharide of S. pneumoniae serotype 8 stimulates or enhances an immune response to the antigen when said composition is administered to an animal.

2. The composition of claim 1 which is suitable for administration via a route selected from the group consisting of oral and parenteral.

3. The composition of claim 1 wherein the antigen is selected from the group consisting of non-immunogenic and weakly immunogenic carbohydrates.

**WEST****End of Result Set**☐  

L7: Entry 4 of 4

File: USPT

Dec 9, 1997

US-PAT-NO: 5695768DOCUMENT-IDENTIFIER: US 5695768 A

TITLE: Immunostimulating activity of Streptococcus pneumoniae serotype 8 oligosaccharides

DATE-ISSUED: December 9, 1997

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Malcolm; Andrew J.	Edmonton			CA

US-CL-CURRENT: 424/244.1, 424/193.1, 424/197.11, 424/282.1, 536/123.1

## CLAIMS:

What is claimed is:

1. A method of augmenting an immunogenic response to an antigen comprising administering an oligosaccharide of *S. pneumoniae* serotype 8, which contains a determined immunogenic epitope, along with said antigen.
2. The method of claim 1 wherein said administration is selected from the group consisting of oral and parenteral.
3. The method of claim 1 wherein the antigen is selected from the group consisting of non-immunogenic and weakly immunogenic carbohydrates.
4. The method of claim 1 wherein the oligosaccharide is covalently linked to a carrier.
5. The method of claim 4 wherein the antigen is covalently linked to the same carrier as the oligosaccharide.

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L4: Entry 1 of 1

File: USPT

Jan 2, 2001

US-PAT-NO: 6168796DOCUMENT-IDENTIFIER: US 6168796 B1

TITLE: Immunostimulating activity of Streptococcus pneumoniae serotype 8 oligosaccharides

DATE-ISSUED: January 2, 2001

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Malcolm; Andrew J.	Edmonton			CA

US-CL-CURRENT: 424/244.1, 424/193.1, 424/197.11, 424/203.1, 424/282.1, 536/123.1

## CLAIMS:

What is claimed is:

1. A method of augmenting an immune response to a pathogen comprising administering to a mammal in need of such treatment an effective amount of a composition comprising a) at least one antigen of said pathogen, which antigen is not an oligosaccharide of *S. pneumoniae* serotype 8; b) an oligosaccharide of *S. pneumoniae* serotype 8 which contains an immunogenic epitope; and c) a suitable pharmaceutical excipient, wherein said oligosaccharide of *S. pneumoniae* serotype 8 stimulates or enhances an immune response to the antigen when said composition is administered to an animal.
2. The method of claim 1 wherein the administration is selected from the group consisting of oral and parenteral.
3. The method of claim 1 wherein said antigen is an oligosaccharide of a bacterial or viral polysaccharide.
4. The method of claim 3 wherein said polysaccharide is selected from the group consisting of capsular polysaccharides of *S. pneumonococcus* serotypes 1, 2, 3, 4, 5, 6B, 7, 7F, 9N, 9V, 10A, 11A, 12, 12F, 14 15B, 17F, 18C, 19F, 19A, 20, 22, 23F and 33F.
5. The method of claim 1 wherein said composition comprises two or more antigens of said pathogen.
6. The method of claim 1 which does not induce carrier suppression.
7. The method of claim 1 which does not induce antigenic competition.
8. The method of claim 1 wherein said administration is performed more than once.
9. The method of claim 8 wherein said administration comprises an initial administration followed by one or more additional administrations.
10. The method of claim 8 wherein said administration is an annual administration.

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## Application Number Information

Application Number: **09/225507** [Order This File](#) [Assignments](#)

Examiner Number: **72793 / GRASER, JENNIFER**

Filing Date: **01/06/1999**

Group Art Unit: **1645**

Effective Date: **01/06/1999**

Class/Subclass: **424/244.100**

Application Received: **01/06/1999**

Lost Case: **NO**

Patent Number: **6168796**

Interference Number:

Issue Date: **01/02/2001**

Unmatched Petition: **NO**

Date of Abandonment: **00/00/0000**

L&R Code: **Secrecy Code:1**

Attorney Docket Number: **000475-244**

Third Level Review: **NO**

Secrecy Order: **NO**

Status: **150 /PATENTED CASE**

Status Date: **12/14/2000**

Confirmation Number: **2395**

Oral Hearing: **NO**

Title of Invention: **IMMUNOSTIMULATING ACTIVITY OF STREPTOCOCCUS PNEUMONIAE SEROTYPE 8 OLIGOSACCHARIDES**

Bar Code	PALM Location	Location Date	Charge to Loc	Charge to Name	Employee Name	Location
09225507	9200	10/23/2002	No Charge to Location	No Charge to Name	JACQUES, PAUL	

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Info

[Contents](#)

[Petition Info](#)

[Atty/Agent Info](#)

[Continuity Data](#)

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L6: Entry 2 of 2

File: USPT

Jun 29, 1999

US-PAT-NO: 5916571DOCUMENT-IDENTIFIER: US 5916571 A

TITLE: Immunostimulating activity of streptococcus pneumoniae serotype 8 oligosaccharides

DATE-ISSUED: June 29, 1999

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Malcolm; Andrew J.	Edmonton			CA

US-CL-CURRENT: 424/244.1, 424/193.1, 424/234.1, 536/123.1, 536/127

## CLAIMS:

What is claimed is:

1. A method of making a composition useful for stimulating an immune response to an antigen, which immunostimulatory composition consists essentially of an antigen, which antigen is not an oligosaccharide of *S. pneumoniae* serotype 8 and which antigen is not attached to an oligosaccharide of *S. pneumoniae* serotype, an oligosaccharide of *S. pneumoniae* serotype 8 which contains an immunogenic epitope in an amount sufficient to augment an immunogenic response to said antigen, and a suitable pharmaceutical excipient, wherein said oligosaccharide of *S. pneumoniae* serotype 8 stimulates or enhances an immune response to the antigen when said composition is administered to an animal, said method comprising:

- a) cleaving *S. pneumoniae* serotype 8 polysaccharide into oligosaccharides so as to preserve immunogenic epitopes on the resulting oligosaccharides;
- b) separating the resulting oligosaccharides based on size;
- c) selecting those oligosaccharides which contain immunogenic epitopes; and
- d) mixing the selected *S. pneumoniae* serotype 8 oligosaccharides with an antigen, which antigen is not an oligosaccharide of *S. pneumoniae* serotype 8 and which antigen is not attached to an oligosaccharide of *S. pneumoniae* serotype 8, and a suitable pharmaceutical excipient.

2. The method of claim 1 wherein said cleavage is performed using acid hydrolysis.

3. The method of claim 1 wherein the composition produced is suitable for administration via a route selected from the group consisting of oral and parenteral.

4. The method of claim 1 wherein the antigen is selected from the group consisting of non-immunogenic and weakly immunogenic carbohydrates.

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Date: 11/4/2003

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**PALM INTRANET**

## Application Number Information

Application Number: **08/787106** [Order This File](#) [Assignments](#)

Examiner Number: **72793 / GRASER, JENNIFER**

Filing Date: **01/22/1997**

Group Art Unit: **1641**

Effective Date: **01/22/1997**

Class/Subclass: **424/244.100**

Application Received: **01/22/1997**

Lost Case: **NO**

Patent Number: **5916571**

Interference Number:

Issue Date: **06/29/1999**

Unmatched Petition: **NO**

Date of Abandonment: **00/00/0000**

L&R Code: Secrecy Code:1

Attorney Docket Number: **000475-196**

Third Level Review: **NO**

Secrecy Order: **NO**

Status: **250 /PATENT EXPIRED DUE TO NONPAYMENT OF MAINTENANCE FEES UNDER 37 CFR 1.362**

Status Date: **07/30/2003**

Confirmation Number: **6055**

Oral Hearing: **NO**

Title of Invention: **IMMUNOSTIMULATING ACTIVITY OF STREPTOCOCCUS PNEUMONIAE SEROTYPE 8 OLIGOSACCHARIDES**

Bar Code	PALM Location	Location Date	Charge to Loc	Charge to Name	Employee Name	Location
<b>08787106</b>	<b>9200</b>	<b>10/23/2002</b>	<b>No Charge to Location</b>	<b>No Charge to Name</b>	<b>WASEEM,MOHAMMED</b>	

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[Contents](#)

[Petition Info](#)

[Atty/Agent Info](#)

[Continuity Data](#)

[Foreign Data](#)

[Inv](#)

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[Search](#)

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L3: Entry 2 of 2

File: USPT

Feb 2, 1999

US-PAT-NO: 5866132DOCUMENT-IDENTIFIER: US 5866132 A

TITLE: Immunogenic oligosaccharide compositions

DATE-ISSUED: February 2, 1999

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Malcolm; Andrew J.	Edmonton			CA

US-CL-CURRENT: 424/193.1, 424/234.1, 424/243.1, 530/395, 530/403, 530/405

## CLAIMS:

What is claimed is:

1. A composition comprising a conjugate, wherein each conjugate consists essentially of:

(a) at least one oligosaccharide hapten which retains at least one immunogenic epitope wherein each said oligosaccharide hapten has a multiple of repeat subunits; and

(b) a carrier which elicits a thymus dependent immune response in a subject, wherein said hapten is covalently coupled directly to said carrier and wherein said hapten-carrier conjugate is protectively immunogenic.

2. The composition of claim 1 wherein said hapten is an oligosaccharide of a bacterial or viral polysaccharide.

3. The composition of claim 1 wherein the presence of said immunogenic epitope is determined using inhibition ELISA.

4. The composition of claim 2 wherein said oligosaccharide is produced by acid hydrolysis of said polysaccharide.

5. The composition of claim 1 wherein said protective immunogenicity is determined by isotype ELISA.

6. The composition of claim 1 wherein said protective immunogenicity is determined by bactericidal or opsonization assay.

7. The composition of claim 2 wherein said polysaccharide is selected from the group consisting of capsular polysaccharides of *S. pneumococcus* serotypes 1, 2, 3, 4, 5, 6B, 7, 7F, 8, 9N, 9V, 10A, 11A, 12, 12F, 14, 15B, 17F, 18C, 19F, 19A, 20, 22, 23F and 33F.

8. The composition of claim 1 which comprises two or more haptens.

9. The composition of claim 1 which does not induce carrier suppression.

10. The composition of claim 1 which does not induce antigenic competition.
11. The composition of claim 1 further comprising an adjuvant.
12. A composition comprising:
  - (a) a conjugate which comprises a size-separated oligosaccharide of *S. pneumoniae* serotype 8 which retains an immunogenic epitope which oligosaccharide is directly coupled to a protein carrier which elicits a thymus dependent immune response in a subject; and
  - (b) a suitable pharmaceutical excipient, wherein said conjugate provides an immunoprotective effect.
13. The composition of claim 12 which does not induce carrier suppression.
14. The composition of claim 12 which does not induce antigenic competition .



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L2: Entry 1 of 1

File: USPT

Oct 17, 2000

US-PAT-NO: 6132723DOCUMENT-IDENTIFIER: US 6132723 A

TITLE: Immunogenic oligosaccharide compositions

DATE-ISSUED: October 17, 2000

**INVENTOR-INFORMATION:**

NAME	CITY	STATE	ZIP CODE	COUNTRY
Malcolm; Andrew J.	Edmonton			CA

US-CL-CURRENT: 424/193.1, 424/194.1, 424/196.11, 424/197.11, 424/234.1, 424/244.1, 514/53, 514/54, 530/403, 530/416, 530/417, 536/123.1**CLAIMS:**

What is claimed is:

1. A method of providing an immune response against a bacterial or viral pathogen comprising administering to a mammal in need of such treatment an effective amount of a composition comprising at least one conjugate of at least one oligosaccharide hapten which retains at least one immunogenic epitope wherein each said oligosaccharide hapten has a multiple of repeat subunits; and a carrier which elicits a thymus dependent immune response in a subject, wherein said hapten is covalently coupled directly to said carrier.
2. The method of claim 1 wherein the administration is selected from the group consisting of oral and parenteral.
3. The method of claim 1 wherein said hapten is an oligosaccharide of a bacterial or viral polysaccharide.
4. The method of claim 3 wherein said polysaccharide is selected from the group consisting of capsular polysaccharides of *S. pneumococcus* serotypes 1, 2, 3, 4, 5, 6B, 7, 7F, 8, 9N, 9V, 10A, 11A, 12, 12F, 14, 15B, 17F, 18C, 19F, 19A, 20, 22, 23F and 33F.
5. The method of claim 1 wherein said composition comprises two or more haptens.
6. The method of claim 1 which does not induce carrier suppression.
7. The method of claim 1 which does not induce antigenic competition.
8. The method of claim 1 which is performed subsequent to exposure of said mammal to a bacterial or viral polysaccharide.
9. The method of claim 1 wherein said administration is performed more than once.
10. The method of claim 9 wherein said administration comprises an initial administration followed by one or more additional administrations.
11. The method of claim 9 wherein said administration is an annual

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L1: Entry 1 of 1

File: USPT

Sep 15, 1998

US-PAT-NO: 5807553DOCUMENT-IDENTIFIER: US 5807553 A

TITLE: Immonogenic oligosaccharide compositions

DATE-ISSUED: September 15, 1998

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Malcolm; Andrew J.	Edmonton			CA

US-CL-CURRENT: 424/193.1; 424/194.1, 424/196.11, 424/197.11, 424/234.1, 530/403, 530/416, 530/417

## CLAIMS:

What is claimed is:

1. A method of preparing a composition comprising a conjugate, wherein each conjugate consists essentially of at least one oligosaccharide hapten which retains at least one immunogenic epitope wherein each said oligosaccharide hapten has a multiple of repeat subunits and a carrier which elicits a thymus dependent immune response in a subject, wherein said hapten is covalently coupled directly to said carrier and wherein said hapten-carrier conjugate is protectively immunogenic, which method comprises:

a) cleaving a bacterial or viral polysaccharide antigen which produces a thymus independent immunogenic response in a subject into oligosaccharide repeat units wherein the immunogenic epitopes on at least one of the resulting oligosaccharide repeat units is preserved;

b) separating the resulting oligosaccharide repeat units into oligosaccharide haptens having a multiple of repeat subunits;

c) selecting those oligosaccharide haptens which retain at least one immunogenic epitope as oligosaccharide haptens;

d) activating one or more of the oligosaccharide haptens selected in step c); and

e) directly coupling the activated oligosaccharide haptens to a carrier which elicits a thymus dependent immune response in a subject, wherein the resulting composition is protectively immunogenic.

2. The method of claim 1 wherein said cleavage is performed using acid hydrolysis.

3. The method of claim 1 wherein said activation is acidification on a cation column.

4. The method of claim 1 wherein said coupling is performed using EDC or periodate.

5. The method of claim 1 wherein said coupling provides a predictable ratio of

happen to carrier.

6. The method of claim 1 wherein steps a) through d) are repeated using at least one additional bacterial or viral polysaccharide to result in a di- or multi-valent conjugate.

7. The method of claim 6 wherein said bacterial polysaccharides are selected from the group consisting of capsular polysaccharides of *S. pneumococcus* serotypes 1, 2, 3, 4, 5, 6B, 7, 7F, 8, 9N, 9V, 10A, 11A, 12, 12F, 14, 15B, 17F, 18C, 19F, 19A, 20, 22, 23F and 33F.

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L1: Entry 1 of 1

File: USPT

Sep 15, 1998

US-PAT-NO: 5807553DOCUMENT-IDENTIFIER: US 5807553 A

TITLE: Immonogenic oligosaccharide compositions

DATE-ISSUED: September 15, 1998

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Malcolm; Andrew J.	Edmonton			CA

## ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE CODE
Alberta Research Council	Edmonton			CA	03

APPL-NO: 08/ 647602 [PALM]

DATE FILED: May 13, 1996

## PARENT-CASE:

This application is a divisional of application Ser. No. 08/477,497, filed Jun. 7, 1995.

INT-CL: [06] A61 K 39/385

US-CL-ISSUED: 424/193.1; 424/194.1, 424/196.11, 424/197.11, 424/234.1, 530/403, 530/416, 530/417

US-CL-CURRENT: 424/193.1; 424/194.1, 424/196.11, 424/197.11, 424/234.1, 530/403, 530/416, 530/417

FIELD-OF-SEARCH: 424/234.1, 424/193.1, 424/194.1, 424/196.11, 424/197.11, 530/403, 530/416, 530/417

PRIOR-ART-DISCLOSED:

## U.S. PATENT DOCUMENTS

	PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
<input type="checkbox"/>	<u>4619828</u>	October 1986	Gordon	
<input type="checkbox"/>	<u>4644059</u>	February 1987	Gordon	
<input type="checkbox"/>	<u>4663160</u>	May 1987	Tsay	
<input type="checkbox"/>	<u>4673574</u>	June 1987	Anderson	
<input type="checkbox"/>	<u>4695624</u>	September 1987	Marburg et al.	
<input type="checkbox"/>	<u>4711779</u>	December 1987	Porro et al.	424/92
<input type="checkbox"/>	<u>4771127</u>	September 1988	Cryz et al.	
<input type="checkbox"/>	<u>4882317</u>	November 1989	Marburg et al.	
<input type="checkbox"/>	<u>5153312</u>	October 1992	Porro	530/405

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FOREIGN-PAT-NO	PUBN-DATE	COUNTRY	US-CL
1181344	January 1985	CA	
1261320	September 1989	CA	
2052323	March 1992	CA	
0 208 375	January 1987	EP	
0497525	January 1992	EP	
0 497525 A2	August 1992	EP	
WO87/06267	October 1987	WO	

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ART-UNIT: 161



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**ABSTRACT:**

The invention provides immunogenic oligosaccharide compositions and methods of making and using them. In particular, the compositions comprise oligosaccharides covalently coupled to carrier protein, wherein the resultant conjugate has been shown to contain specific immunogenic epitopes and elicits a protectively immunogenic response.

7 Claims, 26 Drawing figures